

Claims:

WHAT IS CLAIMED IS:

Sub 1. 1. Apparatus for joining a plurality of pieces of pipe, including a first piece of pipe fabricated with a cross-sectional sidewall pattern along its length that is similar in size and shape to the cross-sectional sidewall pattern of a second piece of pipe, said first piece having a first female end that is temporarily deformed for receiving a non-deformed end of said second piece of pipe, said temporary deformation being both sufficiently large to permit the insertion of said non-deformed end of said second piece of pipe but also sufficiently small to ensure that the material memory of said first end returns said first end toward its original non-deformed configuration with sufficient compressive force to grip said second end and prevent its inadvertent removal from engagement with said first end.

2. The apparatus of Claim 1, including engagement elements formed within said cross-sectional sidewall pattern, said engagement elements acting between said first and said second pieces of pipe to increase the force necessary to disengage said pipe pieces from each other following assembly.

3. The apparatus of Claim 1, in which said pipe sidewall pattern includes a corrugated exterior surface and includes an internal non-corrugated liner element.

4. The apparatus of Claim 1, in which said pipe sidewall pattern is non-corrugated and has a generally constant radius along its length.

5. The apparatus of Claim 1, in which said first piece of pipe includes a second end remote from said first end, said second end also being temporarily deformed to function as a female end for receiving a corresponding non-deformed end of a third piece of pipe, said third piece of pipe having a cross-sectional sidewall pattern along its length that is similar in size and shape to the cross-sectional sidewall pattern of said first and second pieces of pipe.

6. The apparatus of Claim 1, including a sealing element positioned between confronting surfaces of said first and second pieces of pipe to help provide a watertight seal therebetween.

7. The apparatus of Claim 1, including an adhesive material acting between confronting surfaces of said first and second pieces of pipe to bond said first and second pieces to each other upon insertion of said second piece into said female end of said first piece.

8. A stretching tool for use in connection with the apparatus of Claim 1, including a channel into which an edge of said first piece of pipe can be inserted in its originally fabricated shape, said tool including means to temporarily deform said edge to said female end configuration capable of receiving said non-deformed end of said second pipe piece.

9. The tool of Claim 8, including a plurality of rollers positionable along the inside and outside surfaces of said eventual female end of said first piece of pipe, and further including means for exerting force to act between said rollers and said eventual female end to deform said female end from its originally fabricated shape.

10. A temporary stretch-holding device for use in connection with the apparatus of Claim 1, said device including a first portion for temporary insertion into said deformed female end of said first pipe piece, said first portion being sized and configured to retain a sufficient degree of said deformation of said female end so that, upon said removal of said device from said female end, a non-deformed end of said second piece of pipe may be inserted into engagement with said female end.

11. The device of Claim 10, in which said device is fabricated with a cross-sectional sidewall pattern that is similar in size and shape to the cross-sectional sidewall pattern of said first piece of pipe, and further including a second portion to assist in desired removal of said device from said temporary insertion into said deformed female end, said second portion includes a radial cut to allow a degree of compression of said cross-sectional pattern to facilitate the desired insertion into and removal from said female end.

12. The device of Claim 10, in which said device is fabricated with a cross-sectional sidewall pattern that is similar in size and shape to the cross-sectional sidewall pattern of said first piece of pipe, and further including a second por-

tion to assist in desired removal of said device from said temporary insertion into said deformed female end, said second portion includes an axially lengthwise cut to allow a degree of compression of said device to facilitate the desired insertion into and removal from said female end.

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14.                    The device of Claim 10, in which said second portion includes a grippable area of said device upon which force can be exerted to effect the desired removal of said device from said deformed female end.

15.                    The device of Claim 10, in which said device is sized and configured for use as a cover over the pipe joint after said device is removed from said temporary engagement within said female end.

16.                    A method of assembling a plurality of pipe pieces together, including the steps of:  
providing a plurality of pipe pieces fabricated with a substantially uniform cross-sectional sidewall pattern along their length;  
stretching a first end of at least one of said pipe pieces sufficiently to permit the insertion of a non-stretched end of another piece of said pipe without stretching said first end so far as to destroy its material memory;  
inserting said non-stretched end of said another piece of said pipe into said stretched first

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end; and

allowing said material memory of said stretched end to return said first end toward its original non-stretched configuration with sufficient compressive force to grip said non-stretched end of said another piece of said pipe and prevent its inadvertent removal from engagement with said stretched end.

17. The method of Claim 16, in which said step of stretching a first end is performed by a tool having a channel into which an edge of said first end can be inserted in its originally fabricated shape, said tool including means to temporarily stretch said edge to a configuration capable of receiving said non-stretched end of said another piece of said pipe.

18. The method of Claim 16, including the steps of:  
inserting into said temporarily stretched first end a device for holding said stretch prior to said step of inserting said non-stretched end of said another piece of said pipe into said stretched first end, said device being sized and configured to retain a sufficient degree of said stretch of said first end so that, upon said removal of said device from said stretched end, said non-stretched end of said another piece of said pipe may be inserted into engagement with said stretched end;  
leaving said device in its temporary insertion position for a discrete period of time to facilitate transport, handling, or other processing of said pipe; and  
removing said device from said stretched end prior to insertion of said non-stretched end of said another pipe piece.

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A coupling system for coupling like-shaped and like-sized pipe segments to each other, including a female end of a first pipe and a male end of a second segment, at least one of said female and said male ends being temporarily deformed within its elastic limits to permit insertion of said male end into said female end, said temporarily deformed end returning toward its original configuration following insertion of said male end into said female end, said female and male ends configured so that hoop stresses are generated by the material memory of said deformed end to maintain desired engagement between said pipe segments.

20.

A pipe joint comprising:

first and second pieces of pipe having a generally uniform cross-sectional pattern; a female end of said first piece of pipe formed by temporary expansion of said end via application of energy thereto, said expansion not exceeding the limits of the pipe material's ability to return substantially to its original cross-sectional shape and size; and a non-expanded end of said second piece of pipe insertable within said female end of said first piece of pipe while said female end is expanded.

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